

**Supplement to the
Draft Puget Sound Salmon Recovery Plan**

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Prepared by

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DISCLAIMER

Under the Endangered Species Act of 1973 (ESA), the goal of a recovery plan is the conservation and survival of a threatened or endangered species. Recovery plans are prepared by the National Marine Fisheries Service (NMFS), consistent with the agency's obligations under the ESA, often with the assistance of recovery teams, contractors, state agencies, and others. Recovery plans are not regulatory or decision documents—that is, the recommendations in a recovery plan are not considered final decisions unless and until they are actually proposed for implementation. Objectives will be attained and funds expended contingent upon appropriations, priorities, and other budgetary constraints. Nothing in this Plan should be construed as a commitment or requirement that any Federal agency obligate or pay funds in contravention of the Anti-Deficiency Act, 31 U.S.C. 1341, or any other law or regulation. Recovery plans do not necessarily represent the views, official positions, or approval of any individuals or agencies, other than those of NMFS, and they represent the official positions of NMFS only after they have been approved by the NMFS Northwest Regional Administrator, after giving notice of a proposed Plan and opportunity for public comment. Approved recovery plans are subject to modification as dictated by new findings, changes in species status, and the completion of recovery actions.

1.0 INTRODUCTION

The Endangered Species Act of 1973 (ESA) requires the National Marine Fisheries Service (NMFS) to develop recovery plans for species listed under the Act. The purpose of recovery plans is to identify actions needed “for the conservation and survival” [ESA section 4(f)(1)] of threatened and endangered species to the point that they no longer need the Act’s protection.

To be approved by NMFS, a recovery plan must meet certain requirements prescribed by the ESA [listed in ESA section 4(f)(1)(B) and Section 4.0 of this document]. When other entities such as the Shared Strategy for Puget Sound develop plans intended to provide for ESA recovery, NMFS writes a “supplement” summarizing the Plan and noting any necessary additions or qualifications. The supplement then becomes part of the ESA recovery plan for the ESU. This document is NMFS’ supplement for the Draft Puget Sound Salmon Recovery Plan. It contains the following components: the Northwest regional context for the Plan; background and overview of the Plan and its development; a discussion of how the Plan satisfies ESA recovery plan requirements, including qualifications and additional actions that NMFS believes are necessary to support recovery; and a description of NMFS’ intended use of the Plan.

NMFS believes it is critically important to base ESA recovery plans for Pacific salmon on the many state, regional, tribal, local, and private conservation efforts already underway throughout the region. Local support of recovery plans by those whose activities directly affect the listed species, and whose actions will be most affected by recovery requirements, is essential. NMFS’ approach to recovery planning has therefore been to support and participate in locally led collaborative efforts to develop recovery plans, involving local communities, state, tribal, and Federal entities, and other stakeholders.

On June 30, 2005, the Shared Strategy for Puget Sound, a nonprofit organization that coordinates recovery planning for Puget Sound salmonids, presented its locally developed listed species recovery plan (Plan) to NMFS in accordance with technical guidance and delisting criteria. The Plan strives to achieve multiple objectives, but focuses particularly on the recovery of Puget Sound Chinook salmon, which also is the focus of this Supplement. Many of the actions identified in the Plan will also benefit Hood Canal summer chum salmon, whose geographic range is contained within a portion of the range of Puget Sound Chinook salmon, and bull trout, whose geographic range includes, but is more extensive than that of Puget Sound Chinook salmon. A draft recovery plan prepared specifically for the Hood Canal summer chum evolutionarily significant unit (ESU) was completed by the Hood Canal Coordinating Council, a regional council of governments, and delivered to NMFS and the State of Washington in November 2005, for review through a separate process. NMFS has begun reviewing that plan and will present its findings for public review in 2006; Hood Canal summer chum salmon will therefore not be considered further in this document. NMFS will also review a draft plan for the recovery of the Skokomish Chinook salmon population of the Puget Sound Chinook ESU in late 2005 and present its findings for public review in early 2006.

As the lead ESA agency for Chinook salmon and Hood Canal summer chum salmon,¹ NMFS is responsible for reviewing these locally produced recovery plans and deciding whether adoption is merited. The U.S. Fish and Wildlife Service (USFWS) is the lead ESA agency for bull trout; that species is not considered further in this Supplement.

This Plan was developed with the goal of building on the requirements of four interrelated planning initiatives: (1) ESA recovery planning for salmon and bull trout; (2) watershed planning pursuant to the Washington Watershed Management Act; (3) habitat protection and restoration pursuant to the Washington Salmon Recovery Act; and (4) the Washington State Growth Management Act.

In the case of listed salmon, additional considerations are also important. Puget Sound Chinook salmon, and all of the other listed salmonids in other ESUs, have historically been harvested, and there is a strong public interest in restoring them to harvestable levels. Because listed salmon often migrate with non-listed fish, the listings not only constrain the harvest of listed fish but also have become factors limiting the harvest of other non-listed fish.

Northwest Indian tribes have legally enforceable treaty rights reserving to them a share of the harvestable salmon. Achieving the basic purposes of the ESA such that the species no longer needs the protection of the Act may not by itself fully meet these rights and expectations, although it will lead to major improvements in the current situation. Ensuring a sufficient abundance of salmon to sustain harvest can be an important element in fulfilling trust and treaty rights as well as garnering public support for these plans.

Thus, it is appropriate for recovery plans to take these considerations into account and plan for a recovery strategy that includes harvest. In some cases, the desired abundances for harvest may come about through increases in the naturally spawning population. In others, the recovery strategy may include appropriate use of hatcheries to support a portion of the harvest. So long as the overall plan is likely to achieve the biological recovery of the listed ESU, it will be acceptable as a recovery plan.

NMFS appointed the Puget Sound Technical Recovery Team (PSTRT), which worked with the Shared Strategy work group to specify the means of addressing the technical gaps they identified in the watershed plans and the regional portion of the recovery plan (available at <http://www.nwr.noaa.gov/Salmon-Recovery-Planning/ESA-Recovery-Plans/TRT-Review.cfm>). The PSTRT concluded that if the actions outlined in the watershed and regional scale plans and the additional measures identified to fill technical gaps are implemented, the Puget Sound Chinook ESU is likely to make significant and positive strides toward meeting the viability criteria.

¹ The geographic area covered by the Plan also encompasses the entire range of the Puget Sound steelhead (*Oncorhynchus mykiss*) ESU. NMFS is currently reviewing the status of this ESU under the ESA. The Puget Sound steelhead ESU is not currently listed or proposed for listing. At this time, NMFS is not considering benefits of salmon recovery measures proposed in this Plan for Puget Sound steelhead populations, but may do so in the future.

After further review comparing the Plan's contents to ESA requirements, NMFS has concluded that the Shared Strategy's Draft Puget Sound Salmon Recovery Plan, with the addition of enhancements identified in this Supplement, meets ESA section 4(f) recovery plan requirements.

2.0 NMFS NORTHWEST REGIONAL CONTEXT FOR THE PLAN

As part of its recovery planning efforts, NMFS Northwest Region designated "recovery domains" in the Pacific Northwest. Puget Sound is one of five geographically based recovery domains for preparing recovery plans for listed salmon species. The other domains are the Willamette/Lower Columbia, Interior Columbia, Oregon Coast, and Southern/Oregon Northern California Coast. For each domain, NMFS convened an independent Technical Recovery Team (TRT) to develop recommendations on biological viability criteria for the ESU and its component populations, to make technical findings regarding limiting factors, to provide scientific support to local and regional recovery planning efforts, and to provide scientific evaluations of recovery plans. The TRT for the Puget Sound Chinook (PSTRT) includes biologists from NMFS, state, tribal, and local agencies. The PSTRT developed technical guidance for use by watershed groups in Puget Sound.

NMFS' intent in establishing TRTs for each domain was to seek unique geographic and species expertise and to develop a solid scientific foundation for the recovery plans. All the TRTs used the same biological principles for developing their ESU and population viability criteria. These principles are described in a NMFS technical memorandum, *Viable Salmon Populations and the Recovery of Evolutionarily Significant Units* (McElhany et al., 2000). Viable salmonid populations (VSP) are defined in terms of four parameters: abundance, population productivity or growth rate, population spatial structure, and life history and genetic diversity. A viable ESU is naturally self-sustaining. Each TRT made recommendations using the VSP framework and based on data availability, the unique biological characteristics of the ESUs and habitats in the domain, and the members' collective experience and expertise. Although NMFS has encouraged the TRTs to develop regionally specific approaches for evaluating viability and identifying factors limiting recovery, each TRT is working from a common scientific foundation to ensure that the recovery plans are scientifically sound and based on consistent biological principles.

In each domain, NMFS is also working with state, tribal, local and other Federal stakeholders to develop a planning forum appropriate to the domain, which builds to the extent possible on ongoing, locally led efforts. The role of these planning forums is to use the TRT reports and other technical products to agree on recovery goals and limiting factors assessments, then develop locally appropriate and locally supported recovery actions needed to achieve recovery goals. While these forums also are working from a consistent set of assumptions regarding needed recovery plan elements, the process by which they develop those elements, and the form they take, may differ among domains.

In June 2005, in addition to the Shared Strategy Plan and the Hood Canal Coordinating Council's Summer Chum Plan, NMFS received locally developed recovery plans for listed salmon and steelhead from the Upper Columbia Salmon Recovery Board and the Washington Snake River Salmon Recovery Board. The Yakima Subbasin Recovery Board submitted a draft local recovery plan in October 2005. NMFS expects to publish supplements and notices of availability for those plans in late 2005 and 2006. NMFS is also working with the states of Oregon and Idaho to draft

recovery plans for listed salmon ESUs throughout the region by December 2005. As draft plans are completed, NMFS will make them available for public review and comment.

3.0 BACKGROUND AND OVERVIEW OF THE PLAN

The Shared Strategy is a collaborative initiative that began in 1999 after NMFS listed Puget Sound Chinook salmon and Hood Canal summer chum as threatened, and USFWS listed coastal/Puget Sound bull trout as threatened. Representatives of Federal, state, tribal, and local governments, business, the agriculture and forestry industries, conservation and environmental groups, and local watershed planning groups met to shape “one strategy shared by many” for salmon recovery. A key objective defined in this process was to “(B)uild a scientifically robust, practical, cost-effective recovery plan by June 2005 that defines the strategies and actions necessary to recover naturally spawning Chinook salmon, bull trout and Hood Canal summer chum to self-sustaining and harvestable levels within the context of a prosperous economy and sustainable growth (Volume I, Chapter 1).”

Shared Strategy was formed as a nonprofit organization in 2002 to facilitate recovery plan development through a five-step process agreed to by more than 200 participants. NMFS and USFWS endorsed the Shared Strategy approach and participated in developing this plan; the planning process was designed to combine ESA requirements with locally driven recovery efforts and a vision for the future of the region. The idea was to coordinate and integrate recovery efforts throughout the region while maintaining a sound scientific basis for the Plan. The PSTRT worked with regional policy makers and community watershed groups throughout the process.

A fundamental assumption of the Plan is that local watershed efforts are the engine that will lead the Puget Sound Chinook salmon recovery, since restoration and protection actions will take place largely at the watershed level. Thus, the planning process built upon the work of groups and local governments in 14 watershed planning areas (often based on Water Resource Inventory Areas previously defined by the Washington Department of Ecology), which prepared individual watershed recovery plans for their areas.

The Plan is organized into two volumes. Volume I is the “regional plan,” which lays out overall goals and biological objectives and describes limiting factors, threats, and measures to address them at the ESU scale. Volume II comprises the stand-alone watershed plans that address limiting factors, threats, and actions at the population or watershed scale. Volume II also includes the regional plan for managing Puget Sound nearshore areas for Chinook salmon recovery. The watershed plans, including the approach to the nearshore, are summarized in Volume I, Chapter 5.

3.1 Current ESU Status

The current status of Puget Sound Chinook salmon populations is summarized in Volume I, Chapter 2 of the Plan and is discussed or referenced in each of the local plans in Volume II. Results of local habitat and population status assessments are presented in the local watershed chapters in Volume II. The Plan incorporates the NMFS VSP framework as a basis for biological status assessments and recovery goals for Puget Sound Chinook salmon. The Plan also

incorporates the work of the PSTRT, which provided recommendations on biological criteria for population and ESU viability. The PSTRT set forth scientific conditions that would indicate a high probability of persistence into the future for Puget Sound salmon. The current status of the populations in each watershed was derived through local assessments in consultation with the PSTRT and state and tribal co-managers.

In general, based on updated status evaluations considering the four VSP parameters, the Plan concludes that all of the remaining 22 independent populations of Chinook salmon in Puget Sound are at high risk. Overall abundance has declined substantially from historical levels, many populations are small enough that genetic and demographic risks are likely to be relatively high, and spatial structure and diversity have been greatly decreased.

3.2 Threats and Limiting Factors

The reasons for a species' decline are generally analyzed in terms of limiting factors and threats. Limiting factors are defined as the biological conditions limiting population status (e.g. elevated water temperature). Threats are defined as those human activities or naturally induced actions that cause the limiting factors (e.g. loss of shade from riparian vegetation). The Plan examines the general threats and limiting factors for Chinook salmon recovery in Volume I, Chapter 3, with extensive detail provided for populations in each watershed chapter in Volume II. The major limiting factors are described in relation to the biological needs of the species and in categories of habitat, harvest, hatchery management, and additional factors such as climate change, fluctuating ocean conditions, and marine mammal interactions. Hydropower is included in the habitat section of Chapter 3 and discussed in this Supplement in Section 3.2.2. After identifying threats to recovery, the Plan describes specific recovery strategies and measures that will be used to guide actions at the watershed level to mitigate the threats.

3.2.1 *Habitat*

The Plan examines human activities that alter habitat-forming processes such as sediment transport, hydrology, organic matter deposition, nutrient and chemical inputs, temperature and light, floodplain dynamics, riparian function, and nearshore dynamics. Simplification and degradation of riparian, estuarine, nearshore and marine habitat features important to salmon survival are described in Volume I, Chapter 3, and in the individual chapters in Volume II of the Plan.

3.2.1.1 Stream Habitat

In Volume I, Chapter 3, the Plan describes major changes in land use that have resulted in altered watershed function and extensive degradation of riparian areas and stream habitat. Further details are provided in individual chapters of Volume II.

3.2.1.2 Estuary and Nearshore

Figure 3.2 in Volume I, Chapter 3 of the Plan shows changes in estuarine habitat in hectares over approximately the past 100 years. Changes to tidal marsh and swamps, intertidal and nearshore

habitats throughout the Sound are also described in Chapter 3 of Volume I and in various local chapters and the nearshore chapter in Volume II.

3.2.2 *Hydropower*

The Plan summarizes the status and impact of hydropower on Puget Sound Chinook salmon habitat in Volume I, Chapter 3. Details of hydropower facility and operational impacts on salmon habitat and population status are presented in the individual watershed chapters in Volume II.

3.2.3 *Harvest*

In Volume I, Chapter 3, the Plan reviews the history and effects of harvest on Puget Sound Chinook salmon. Discussion includes the history and effects of commercial and recreational fisheries, reduced levels of harvest by treaty tribes and non-Indian fisheries, and a summary of harvest management processes and forums from the Harvest Resource Management Plan, upon which this Plan relies for harvest management strategies.

3.2.4 *Hatcheries*

In Volume I, Chapter 3, the Plan reviews the history of hatcheries in Puget Sound, including the use of hatchery fish to assist in the recovery of wild stocks, supplementation, hazards and risks potentially posed by hatchery operations, and a summary of hatchery management processes and practices from the Chinook Hatchery Resource Management Plan (RMP) and Chinook Hatchery and Genetic Management Plans (HGMPs) upon which this Plan relies.

3.2.5 *Additional Factors*

Volume I, Chapter 3 of the Plan contains a discussion of the following additional factors that affect Puget Sound salmon: global climate change, fluctuating ocean cycles, and marine mammal interactions.

3.3 *Goals*

The collective, overarching long-term goal shared by contributors to the Plan is “to recover self-sustaining, harvestable salmon runs in a manner that contributes to the overall health of Puget Sound and its watersheds and allows us to enjoy and use this precious resource in concert with our region’s economic vitality and prosperity (Volume I, Chapter 1).”

More specific goals are described in Volume I, Chapters 1 and 4 and in the watershed and nearshore chapters included in Volume II. These goals are expressed in terms of ESU-level and population-level viability criteria.

3.3.1 *ESU Viability Criteria*

The PSTRT defined five biogeographical regions of Puget Sound in terms of physical and habitat features, including topography and ecological variations, where groups of Chinook salmon have evolved in common, and identified 22 independent populations within these regions that make up

the ESU. The Plan identifies long-term objectives for each of the 22 extant populations in the ESU. Individual watersheds adopted long-term recovery targets and identified the habitat, hatchery, and harvest actions believed necessary to achieve their long-term objectives. Additionally, they specifically describe strategies and actions proposed for implementation in the near term (e.g., next ten years) to get on a recovery trajectory. Figure 4.4 in the Plan (Volume I, Chapter 4) shows independent populations of Chinook salmon, and Figure 4.5 lists the remaining Chinook salmon populations by geographic region. A description of the conditions that would lead to recovery in each of the five biogeographical regions is presented in Volume I, Chapter 5.

The watershed recovery planning groups and the regional planning body (Shared Strategy) designed their strategies and site-specific actions to achieve the biological viability criteria recommended by the PSTRT for the Puget Sound Chinook salmon ESU. These criteria are summarized as follows:

1. The viability status of all populations in the ESU is improved from current conditions.
2. At least two and up to four Chinook salmon populations in each of five biogeographical regions within the ESU achieve viability, depending on the historical biological characteristics and acceptable risk levels for populations within each region. (See Supplement Table 1 for specific populations.)
3. At least one population from each major genetic and life history group historically present within each of the five biogeographical regions is viable.
4. Tributaries to Puget Sound not identified as primary freshwater habitat for any of the 22 identified populations are functioning in a manner that is sufficient to support an ESU-wide recovery scenario.
5. Production of Chinook salmon from tributaries to Puget Sound not identified as primary freshwater habitat for any of the 22 identified populations occurs in a manner consistent with an ESU recovery.
6. Populations that do not meet the viability criteria for all VSP parameters (i.e., abundance, productivity, spatial structure and diversity) are sustained to provide ecological functions and preserve options for ESU recovery.

The ESU viability criteria describe the recovered state of the ESU (Ruckelshaus et al., 2002). Together, these six criteria describe the habitat conditions and status of Chinook salmon that would result in a naturally self-sustaining ESU with a high likelihood of persistence. Criteria 1, 2, 3, and 6 describe the conditions of extant populations and their primary freshwater areas within the ESU that are consistent with recovery. Criteria 4 and 5 describe the roles that habitat conditions and Chinook juveniles and adults occurring in secondary habitats play in ESU viability.

The PSTRT determined that all 22 populations of Chinook salmon currently are at high risk. The ESU viability criteria recommended by the PSTRT do not require that all 22 populations reach a low risk status over time, but all of them have to improve from current conditions. Accordingly,

most watershed planners in areas with independent populations of Chinook chose to work toward low risk status for their populations to get on a recovery trajectory during the next ten years and as a precautionary approach to eventually recover the entire ESU.

Supplement Table 1 shows the 22 remaining populations in each biogeographical region and relates them to the PSTRT's ESU viability criteria. All 22 populations must improve from current conditions. Additionally, some populations have been identified as needing to achieve low risk status over time to meet the PSTRT's viability criteria.

SUPPLEMENT TABLE 1. Puget Sound Chinook Salmon Populations and Risk Status for ESU Viability

Biogeographical Region	Chinook Populations	Needed at Low Risk Status
Strait of Georgia	North Fork Nooksack South Fork Nooksack	North Fork Nooksack South Fork Nooksack
Strait of Juan de Fuca	Elwha Dungeness	Elwha Dungeness
Hood Canal	Skokomish Mid-Hood Canal	Skokomish Mid-Hood Canal
Whidbey basin	Skykomish Snoqualmie North Fork Stillaguamish South Fork Stillaguamish Upper Skagit Lower Skagit Upper Sauk (early run) Lower Sauk Suiattle (early run) Cascade (early run)	At least 2 to 4, of which at least one is an early run
Central/South Sound basin	Sammamish Cedar Green/Duwamish Puyallup White Nisqually	White (early run) Nisqually (see Section 4.2.1.1)

Three of the five biogeographical regions have only two remaining Chinook salmon populations within them. These are the Strait of Georgia, including the Nooksack watershed; the Strait of Juan de Fuca, including the Elwha/Dungeness; and the Hood Canal region. Both extant populations in each of these regions need to achieve low risk status over time to achieve ESU viability.

The remaining two biogeographical regions have multiple Chinook salmon populations. The Whidbey Basin region, which includes the Skagit, Stillaguamish, Island, and Snohomish watersheds, has ten Chinook salmon populations. The Central/South region, which includes the

Cedar/Sammamish, the Green/Duwamish, the Nisqually, East Kitsap, South Sound, and the Puyallup/White River watersheds, has six populations remaining. The Plan states that these two regions, therefore, have more choices as to which populations ultimately need to achieve a low risk status to meet ESU recovery criteria (with the exception of the remaining early-run Chinook salmon in the White River basin, which need to achieve low risk), and the Nisqually population, which NMFS has concluded also needs to be managed to achieve low risk [see Section 4.2.1.1 of this document]).

The Plan envisions that the role each population will play in ESU recovery (with the two exceptions mentioned) will be clearer after the first ten-year implementation phase. Assigning risk status goals will depend upon how well the first ten years of actions are implemented, how well the populations respond, and execution of a solid adaptive management and monitoring program.

3.3.2 Population Viability Criteria

Population viability criteria are expressed in terms of the four VSP parameters, abundance, productivity, spatial structure and diversity. The PSTRT used historical information and technical models to recommend planning ranges for abundance and productivity that describe viability characteristics for each of the 22 independent Chinook salmon populations in Puget Sound (Ruckelshaus et al., 2002). The PSTRT also described spatial structure and diversity characteristics of low risk populations.

The PSTRT integrated the results from three different types of analysis to develop the planning ranges. The PSTRT presented its results as a range because of inherent variation in salmon populations, uncertainty in historical information, and differences among the analyses and models.

State and tribal fisheries co-managers concurrently developed a set of recovery targets for the abundance and productivity of individual Chinook salmon populations to ensure that population viability was considered in evaluating harvest, hatchery, and habitat measures. These targets are based on estimates of what salmon abundance can be supported by healthy salmon habitat at low productivity and high productivity.

A discussion of both the planning ranges produced by the PSTRT and the recovery targets selected by the co-managers is in Volume I, Chapter 4 of the Plan and in Volume II chapters. The ranges and targets are presented in Figure 4.1 of the Plan (Volume I, Chapter 4, p.137) and on p.10 of this Supplement.

The Shared Strategy approach relied on the work of 14 individual watershed planning areas to set goals for their Chinook salmon populations. The PSTRT reviewed the watershed plans in 2004 and 2005. The individual watershed goals are summarized in Volume I, Chapter 5 of the Plan, and detailed in the individual plans in Volume II.

3.3.3 Short-Term and Long-Term ESU Recovery Goals

The Plan states that achieving recovery could take many decades. Because of the complexity and extent of the changes necessary to reach the recovery targets and the technical and policy

uncertainties associated with the long term, policymakers chose to focus on developing a ten-year work plan within the context of the overall recovery need. Since the existing 22 independent Puget Sound Chinook salmon populations are currently at a high risk of extinction to varying degrees, the short-term goal is to improve conditions for all the populations and to get on a trajectory toward recovery early in implementation. Additional goals in this timeframe include implementing and evaluating the set of short-term strategies and priority actions identified; gaining a preliminary view of the status and trends of important recovery indicators; and making mid-course corrections as needed. In ten years, watershed and regional leaders will put forward the next set of strategies and actions toward achieving the long-term goal. The long-term goal (Section 3.3) is tied to achieving viable salmonid populations, i.e. to achieving self-sustaining populations of Puget Sound Chinook salmon in terms of abundance, productivity, spatial distribution, and diversity.

Populations	Mean spawner abundance for 1996 -2000	Low Productivity Planning Range for Abundance	Low Productivity ¹ Planning Target for Abundance (productivity in parentheses)	High productivity ² Planning Target for Abundance (productivity in parentheses)
NF Nooksack	120	16,000 – 26,000 (1.0)	16,000 (1.0)	3,800 (3.4)
SF Nooksack	200	9,100 – 13,000 (1.0)	9,100 (1.0)	2,000 (3.6)
Lower Skagit	2,300	16,000 – 22,000 (1.0)	16,000 (1.0)	3,900 (3.0)
Upper Skagit	8,920	17,000 – 35,000 (1.0)	26,000 (1.0)	5,380 (3.8)
Upper Cascade	330	1,200 – 1,700 (1.0)	1,200 (1.0)	290 (3.0)
Lower Sauk	660	5,600 – 7,800 (1.0)	5,600 (1.0)	1,400 (3.0)
Upper Sauk	370	3,000 – 4,200 (1.0)	3,030 (1.0)	750 (3.0)
Suiattle	420	600 – 800 (1.0)	610 (1.0)	160 (2.8)
NF Stillaguamish	660	18,000 – 24,000 (1.0)	18,000 (1.0)	4,000 (3.4)
SF Stillaguamish	240	15,000 – 20,000 (1.0)	15,000 (1.0)	3,600 (3.3)
Skykomish	1,700	17,000 – 51,000 (1.0)	39,000 (1.0)	8,700 (3.4)
Snoqualmie	1,200	17,000 – 33,000 (1.0)	25,000 (1.0)	5,500 (3.6)
N Lake WA/Sammamish	194*	4,000 – 6,500 (1.0)	4,000 (1.0)	1,000 (3.0)
Cedar	398*	8,200 – 13,000 (1.0)	8,200 (1.0)	2,000 (3.1)
Green	7,191*	17,000 – 37,700 (1.0)	27,000 (1.0)	Unknown
White	329*	Unknown	Unknown	Unknown
Puyallup	2,400	17,000 – 33,000 (1.0)	18,000 (1.0)	5,300 (2.3)
Nisqually	890	13,000 – 17,000 (1.0)	13,000 (1.0)	3,400 (3.0)
Skokomish	1,500*	Unknown	Unknown	Unknown
Mid-Hood Canal	389	5,200 – 8,300 (1.0)	5,200 (1.0)	1,300 (3.0)
Dungeness	123*	4,700 – 8,100 (1.0)	4,700 (1.0)	1,200 (3.0)
Elwha	1,319*	17,000 – 33,000 (1.0)	17,000 (1.0)	6,900 (4.6)
*Represents spawner escapement 1987 – 2001				

¹The low productivity number in both the range and target represents one adult fish returning from the sea for each spawner, also called the equilibrium point (1:1).

²The high productivity number represents the number of spawners at the point where the population provides the highest sustainable yield for every spawner. The productivity ratio is in parentheses for each population and represents the relationship of fish returning from the sea for each spawner (e.g. 3.4:1 for NF Nooksack).

Figure 4.1 Chinook Spawner Abundance Planning Targets & Ranges for Puget Sound Region. (The numbers are presented for the populations for which analysis was available.)

3.4 Strategies and Actions for Recovery

The Plan's overall recovery strategy, summarized in Volume 1, Chapter 5, is built upon the 14 Puget Sound watershed areas' long-term objectives for salmon recovery (e.g., co-manager targets, properly functioning habitat, etc.), their determination of what it will take over the long-term to address the key factors and threats limiting recovery in their area, and the collective watershed and regional determination on how to meet the PSTRT's ESU viability criteria. The strategy includes specific protection and restoration actions for each watershed as well as actions at the regional ESU scale that need to be implemented in the first ten years to put the ESU on a recovery trajectory toward achieving the long-term objectives.

The strategy can be summarized as follows:

- a) Act immediately to protect functioning habitat and habitat-forming processes through a combination of regulatory, voluntary, and incentive-based tools.
- b) Prioritize, sequence, and implement habitat restoration actions according to the key factors and threats limiting recovery in each watershed and the Puget Sound nearshore and marine waters and estuaries.
- c) Implement the Puget Sound Harvest and Hatchery Resource Management Plans and Hatchery Genetic and Management Plans to ensure harvest and hatchery programs work in concert with recovery objectives.
- d) Address the three H-factors (habitat, harvest, and hatchery) in concert to sequence and synchronize activities between them to achieve recovery goals over time.
- e) Sustain existing and create new collaborative partnerships among stakeholder groups (e.g., farmers, foresters, environmentalists, all levels of government, etc.) at local and regional scales to resolve implementation issues.
- f) Address uncertainties through a robust regional adaptive management and monitoring program that is closely coordinated with local watershed, co-manager, state, and tribal adaptive management and monitoring programs.

3.4.1 Watershed/Site-Specific Strategies and Management Actions

The individual watershed chapters in Volume II of the Plan, summarized in Volume I, Chapter 5, present descriptions of the limiting factors and threats to salmon specific to each watershed. These represent the watershed group's working hypotheses, for which the group developed site-specific strategies and management actions to recover the listed salmon populations in their area. The Plan summarizes and incorporates the PSTRT's review of each watershed's plan, in which the PSTRT identified any gaps, additional factors, or conditions that would merit additional attention or effort to increase the likelihood of achieving a watershed plan's outcomes and contribution to overall ESU recovery.

3.4.2 Regional Strategies

A number of issues, even if appropriately addressed at an individual watershed scale, are common to multiple watersheds and need both regional and local attention to resolve. These issues include the many changes driven by anticipated human population growth, as well as potential effects of global climate change, ocean conditions, and marine mammal populations. The Plan notes that “several of the adaptive strategies suggested by the scientific community stress the need to ensure that local habitat conditions are protected and restored as a buffer against the coming changes, and that harvest and hatchery management consider these long-term factors in their decision-making” (Volume I, Chapter 3).

Regional strategies are presented in terms of habitat protection and restoration, harvest management, hatchery management, and additional strategies and actions to integrate all three toward salmon recovery. The regional strategies are presented in detail in Volume I, Chapter 6.

3.4.2.1 Habitat Protection and Restoration

The regional strategies for habitat protection and restoration make use of existing regulatory and voluntary programs and encourage improvements through further analysis and development. Proposals focus on protection of existing habitat and habitat-forming processes; nearshore environments, including estuaries, marine shorelines, and Puget Sound; instream flow protection and enhancement; and the relationships of forest management and farming to salmon habitat.

3.4.2.2 Harvest Management

The Plan notes that a wide range of fisheries affecting Puget Sound Chinook salmon are implemented under the Pacific Salmon Treaty (PST), the Magnuson-Stevens Act, U.S. v. Washington, and/or associated legal and policy forums. It summarizes provisions of the Harvest Management Component of the Comprehensive RMP for Puget Sound Chinook salmon (referred to as the Chinook Harvest Plan), developed by Puget Sound Treaty Tribes and the State of Washington in 2004 (PSTT and WDFW 2004). The Chinook Harvest Plan was prepared under Limit (6) of the 4(d) rule under ESA and is intended to “ensure that fishery-related mortality will not impede rebuilding of natural Puget Sound Chinook populations, to levels that will sustain fisheries, enable ecological functions, and are consistent with treaty-reserved fishing rights.”

Annual fishing regimes are established based on population abundance and target exploitation (and escapement) rates using harvest constraints to the degree necessary to achieve specified objectives. Several monitoring and assessment programs are operated by Washington Department of Fish and Wildlife (WDFW) and the Washington Treaty Tribes so that management regimes can be assessed and adapted as necessary.

3.4.2.3 Hatchery Management

The Plan summarizes existing programs and strategies to produce Chinook salmon in hatcheries for harvest augmentation and population conservation purposes. The Plan also summarizes measures applied in all Chinook salmon hatchery programs to reduce the risk of adverse

ecological, genetic, and demographic effects on natural salmon populations, including new measures developed through the recent “Hatchery Reform” initiative (Hatchery Scientific Review Group, 2004) that improve prospects for meeting hatchery fish production objectives commensurate with natural fish conservation requirements. The Plan also describes hatchery actions implemented specifically to aid Chinook salmon population conservation. Hatchery activities summarized in the Plan are fully described in the Hatchery Component of the Comprehensive RMP for Puget Sound Chinook salmon, developed and prepared under the 4(d) rule by the Puget Sound Treaty Tribes and WDFW in 2004. The Plan also summarizes hatchery strategies established in HGMPs developed for every Chinook salmon hatchery program in Puget Sound. The hatchery actions that are described in the Plan are consistent with the regional and individual hatchery plans for Chinook salmon assembled by tribal and state co-managers.

3.4.2.4 Integration Across the Hs

Recovery will depend on “All-H Integration,” that is, integrating concerted efforts and actions that address habitat, harvest, and hatcheries and working together to adjust approaches and actions over time as population conditions change. Volume I, Chapter 6 defines what is meant by an integrated salmon recovery strategy and describes steps to achieve sets of actions that are consistent and predicted to move populations toward recovery. The intent is both to ensure that these actions have no permanent or long-lasting contrary effects and to advance the ability of these actions to work together synergistically. The Plan calls for advancing the work on all-H integration in the first years of plan implementation.

The Plan states that actions in each “H” need to be properly sequenced in time and space so that the full benefit of the recovery actions implemented may be achieved. An integrated approach will adjust hatchery and harvest management actions commensurate with increasing abundance and productivity, particularly increasing proportions of natural-origin Chinook salmon and broader life history diversity, as habitat productivity improves and capacity increases in response to the implementation of habitat measures proposed in the Plan.

Some of the watershed planning groups in Puget Sound have made progress toward integrating strategies for recovery. Suggestions to these groups for furthering this work are reported in the Plan (Chapter 5, Local Watershed Profiles, Results sections) and in PSTRT’s technical guidelines (Ruckelshaus et al., 2003).

3.5 Plan Implementation

The Plan lists the various legal authorities and management entities able to take actions to recover salmon. Site-specific recovery actions are presented in the individual watershed plans in Volume II of the Plan. Both regional recovery strategies and the schedule for implementation are included in Volume I, Chapters 7 and 9. The watershed chapters in Volume II identify ten-year strategies and actions within their long-term recovery goals. The PSTRT and an interagency policy group added recommendations to increase the likelihood of achieving recovery goals (Volume I, Chapter 5). The Plan also lays out strategies and approaches for issues that require a regional approach in Chapter 6 and identifies a schedule of actions in Chapter 9. As monitoring occurs and new scientific information is added, watersheds and regional entities expect to adjust

and expand their protection and restoration programs beyond ten years, with the next set of ten-year actions to be developed by 2015.

The Plan asserts that if the following key elements are implemented as called for in Volumes I and II, it is highly likely to lead to recovery:

- Watershed groups and the decision makers and responsible entities within them implement the ten-year strategies and priority actions in the local chapters consistent with their authority and responsibility. In addition to restoration actions, this includes protection actions such as updates to the Shoreline Management Act and Critical Areas Ordinances of the Growth Management Act consistent with the priorities in the chapters, and coordination with stormwater manual, clearing and grading, road maintenance, and zoning programs. Sets of actions also include incentive-based and voluntary programs.
- Co-managers and watershed groups/entities work together to develop and refine integration of habitat, harvest, and hatchery goals and strategies.
- Watershed groups/entities implement the recommendations for increasing certainty of achieving their goals as identified in the Results sections of the Watershed Profiles in Volume I, Chapter 5.
- Watershed groups, the Shared Strategy, the PSTRT, and others develop and implement an adaptive management and monitoring program that is integrated at the watershed and regional scale.
- Key decision makers and parties responsible for implementing actions and making adjustments to local and regional elements of the Plan are identified through the adaptive management and monitoring program.
- State and Federal natural resource agencies (e.g., NMFS, Department of Natural Resources, Department of Ecology, Department of Fish and Wildlife, US Army Corps of Engineers, and US Forest Service) implement the actions and meet their responsibilities identified in the regional strategies (Chapter 6) implementation schedule (Chapter 9).

The Shared Strategy Development Committee developed a financing strategy affirmed by a large number of regional representatives from business, government, and tribes. The financing strategy is based on continuing the funding from existing Federal, state, and local sources, which amounts to approximately \$60 million per year for Puget Sound, increasing funding from some of the sources (particularly the state portion of the Salmon Recovery Funding Board), and identifying untapped sources (e.g., competitive grant programs and mitigation funding) to pursue. This strategy is summarized in Volume I, Chapter 8.

3.6 Adaptive Management, Research, Monitoring, and Evaluation

The Plan states that confidence to begin implementation is aided by the recognition that uncertainties and unproven key political and biological assumptions can be tested through adaptive management and monitoring. The Plan calls for the watershed recovery groups to check assumptions, improve knowledge, monitor progress, and adjust their strategies and actions

accordingly. In Volume I, Chapter 7, the Plan lays out a structure for developing the details of an adaptive management and monitoring program at the watershed, regional, and cross-ESU scales. Chapter 7 also identifies the types of questions that need to be asked at each scale, the types of monitoring needed, specific technical and policy issues that need to be addressed across all watersheds, and those identified as having high uncertainty in the current plan.

The first phase of implementation of the Plan involves refining and further defining local, regional, and cross-ESU adaptive management programs beginning in the fall of 2005. Specific actions include the following:

- Clarify how plan strategies link to plan goals and objectives.
- Develop specific draft measures of success by January 2006 with finals by April 2006..
- Hold a series of meetings or workshops with watershed and regional groups to identify metrics, performance standards at the ESU scale, and a decision-making and accountability structure by February 2006 and beyond if needed.
- Conduct an assessment to identify existing programs, where programs or program enhancements are needed, and opportunities for coordination between programs (e.g. between the Washington Forest Practices Rules as amended in 2002 and salmon recovery).
- Develop an adaptive management and monitoring program that is integrated within and between the watershed and regional scales, and that provides a structure for linking decision-making.
- Coordinate with existing monitoring efforts statewide (i.e. Governor's Forum on Monitoring).

In Volume I, Chapter 7, the Plan identifies a preliminary list of technical and policy issues that, because of their high uncertainty, need to be incorporated into the adaptive management program to inform future changes that may be necessary to achieve recovery goals.

3.7 Federal Assurances

In Volume I, Chapter 9, the Plan describes a process by which local and regional entities might receive Federal assurances over time as the Plan is implemented. Whether NMFS will provide regulatory assurances on the basis of a recovery plan depends on several factors:

- The Plan's comprehensiveness, level of detail, and likelihood of achieving desired results
- Comprehensiveness and certainty of commitments for implementation
- Demonstrated progress in implementation of actions called for in the Plan
- Improved status and trends for populations of the listed species

The Plan recommends a staged progress review and the provision of assurances within the next ten years and beyond (as the above criteria are met) for the whole region, individual watersheds, and specific sectors of the region. NMFS supports the proposal to work toward Federal assurances over time, linking the provision of such assurances to the specificity and interim results of individual proposals and the guidance provided by the four factors listed above. No new Federal regulatory assurances are associated with NMFS' adoption of the Plan.

3.8 Estimates of Time and Costs

The ESA section 4(f)(1) requires that the recovery plan include “estimates of the time required and the cost to carry out those measures needed to achieve the Plan’s goal and to achieve intermediate steps toward that goal” (16 U.S.C. 1531-1544, as amended). The Plan estimates that recovery will take many decades. The recovery actions described in the Plan were selected based on their anticipated contribution to the recovery objectives. They are based on biological and technical factors, although consideration was also given to social, cultural, and general economic factors. Given the technical and policy uncertainties associated with implementing a 50- to 100-year plan, it was determined that an initial focus on the first ten years within the context of the overall recovery goal was the best strategy. Such a focus would be most likely to ensure that investments would contribute significantly toward achieving recovery goals and putting watersheds and the ESU on a recovery trajectory.

Shared Strategy’s cost estimates and financing strategy are described in Volume I, Chapter 8 of the Plan. Watershed-specific cost estimates are in Volume II. To establish an estimate of the time required and the cost to carry out the recovery actions, watershed groups used cost estimation models from the Shared Strategy publication, *A Primer on Habitat Project Costs*, and a companion spreadsheet model for non-capital costs (citation in the Plan, Chapter 8). Shared Strategy staff also developed estimates for three programs that span multiple watersheds: hatchery improvements, nearshore and marine habitat protection and restoration, and incentive programs for conservation on private farms and small forest parcels (Volume I, Chapter 8). Figure 8.1 shows these ten-year cost estimates.

The Plan estimates that implementation of the watershed and regional projects and programs for the first ten years would cost approximately \$1.4 billion. The Plan states that slightly more than \$1.2 billion is projected to be needed for capital projects—largely habitat-related—and \$222 million is proposed for non-capital activities such as adaptive management and monitoring (Volume I, Chapter 8). The Plan acknowledges that it may not be possible to fund all of the needs identified at the watershed and ESU level during the initial ten years of plan implementation.

The Plan anticipates that additional economic analysis will be incorporated into the adaptive management process over time and will be used to assist in making decisions regarding implementation of the Plan and, where appropriate, to help realign recovery improvement efforts across affected parties and sectors.

3.9 Public and Scientific Review

The ESA requires both public review and scientific peer review of draft recovery plans. However, the Act does not require that the public be involved in developing the Plans. The

degree of collaboration in the development of this Plan among Federal, state, tribal, and local entities as well as citizen's groups and interested individuals is both innovative and unprecedented. Nevertheless, in fulfillment of the ESA's formal review requirements, there will be a public comment period before the Plan is finalized. (see Section 5.5 of this Supplement.)

3.9.1 Shared Strategy Public Process

Since the Plan is based upon the 14 local watershed planning areas, various local groups held their own community and public processes during development of local draft chapters (specific dates and descriptions can be found in the individual chapters in Volume II of the Plan). Most of the local planning groups also used collaborative multi-stakeholder processes during all the planning stages. Regional strategies described in Chapter 6, Volume I were also developed and refined using collaborative multi-stakeholder processes. Shared Strategy hosted two large regional conferences on salmon recovery planning in 2003 and 2005.

3.9.2 Scientific Review

As in other regional domains defined by NMFS Northwest Region, the Puget Sound planning effort was supported by a NMFS-appointed science panel, the PSTRT. This panel of seven scientific experts from Federal, state, local, and tribal organizations identified historical populations and developed the ESU viability criteria. They developed recommended planning ranges for Chinook salmon populations and provided technical guidance to watershed and regional groups to use in preparing watershed recovery chapters and regional elements of the Plan.

The PSTRT population identification document and technical guidance to watershed groups were reviewed by multiple technical experts from Federal, state, and local agencies, Puget Sound tribes, and academic scientists. The PSTRT viability recovery planning ranges and ESU recovery criteria recommendations received co-manager and scientific peer review (Ruckelshaus et al., 2002) prior to final transmittal to the Northwest Region. State and tribal co-managers also developed Chinook salmon population planning targets as part of the Shared Strategy process. Watershed planning groups used the information from the PSTRT, the co-managers, and other analyses to prepare their local recovery chapters.

Individual draft watershed chapters were submitted to the PSTRT and the Shared Strategy interagency policy group for a technical and policy review in 2004. The PSTRT provided tailored and specific comments to each watershed following the review. The technical and policy feedback is available on the Shared Strategy website at www.sharedsalmonstrategy.org. Watershed planners revised their chapters according to the feedback received during the 2004 review and submitted their updated chapters for inclusion in the regional plan in early 2005.

Together the PSTRT and interagency policy group evaluated how well the local chapters met ESA recovery plan requirements. They summarized the watershed plans' strengths and weaknesses, identified uncertainties and issues that needed further attention, and recommended proposals to close gaps and increase the certainty of meeting the ESA plan requirements. These recommendations are summarized in the Results section of the watershed profiles in Chapter 5, Volume I. Full technical review comments from the PSTRT 2005 reviews of watershed plans are

available at (<http://www.nwr.noaa.gov/Salmon-Recovery-Planning/ESA-Recovery-Plans/TRT-Review.cfm>). The 2005 review process also identified “cross-watershed” issues that require a regional as well as a local approach, such as water resources, H-Integration strategies, and adaptive management and monitoring. These issues are summarized in Volume I, Chapter 7, and will be incorporated into the regional adaptive management program.

Recovery planners were asked a challenging question in developing their plans: How will the suite of habitat, hatchery, and harvest actions combine to cause salmon populations to improve to low risk status? Estimating how salmon populations will respond as recovery plans are implemented over the next few decades is inherently an uncertain exercise. Salmon populations themselves are naturally variable, and pinpointing the effects of a myriad of human actions on top of that natural variability is difficult. In addition the watershed scale of restoration and protection strategies is a scientifically sound, but relatively untested, approach to recovering a wide-ranging species. The aim of the technical reviews conducted by the PSTRT was to identify how the logical basis for developing recovery strategies could be improved, given the inherent uncertainties associated with the task. Together with the Shared Strategy interagency policy group, the PSTRT identified approaches to “fill the gaps”—or improve the certainty—in the watershed and regional plans. Such gap-filling approaches were aimed at improving the certainty in salmon recovery strategies as much as possible, acknowledging that some uncertainties in these early stages of plan development are inevitable and unavoidable.

4.0 THE PLAN AND ESA REQUIREMENTS

As indicated in Section 1.0 of this Supplement, NMFS’ approach to developing a recovery plan for the Puget Sound Chinook salmon ESU, as required under the ESA, has been to support and participate in locally led watershed and ESU-scale planning efforts. For NMFS to formally approve the draft Plan developed by local governments and community members, state, tribal, and Federal entities, and other stakeholders participating in the Shared Strategy, the Plan must meet certain statutory requirements. These include:

- ESA section 4(f)(1)(B) requirements for a recovery plan
- ESA section 4(a)(1) factors for re-classification or de-listing

The intent of these statutory requirements is to make recovery plans specific and accountable. In addition, it is important for the Plans to provide the public and decision-makers with a clear understanding of the goals and scientifically supported strategies needed to recover a listed species (NMFS Interim Recovery Planning Guidance, October 2004). Measurable criteria and site-specific actions logically follow from the goals and strategies.

Section 4.1 contains NMFS’ assessment of and conclusions regarding the Plan’s overall goal and recovery strategy. Section 4.2 is a summary of how the Plan meets the ESA section 4(f)(1)(B) requirements, including the ESA section 4(a)(1) factors for re-classification or delisting. NMFS concludes that the Plan, inclusive of the augmentations to the Plan as identified in this Supplement, meets the ESA requirements.

4.1 The Plan's Recovery Goal and Recovery Strategy

The Plan's recovery strategy is intended to achieve the overarching recovery goal.

4.1.1 *Recovery Goal*

The Plan's overarching goal is to “recover self-sustaining, harvestable salmon runs in a manner that contributes to the overall health of Puget Sound and its watersheds and allows us to enjoy and use this precious resource in concert with our region's economic vitality and prosperity” (Volume I, Chapter 1). NMFS endorses this overall goal.

4.1.2 *Recovery Strategy*

The Plan's overall recovery strategy is summarized in Section 3.4.2 of this Supplement. NMFS supports the overall strategy. In this section we further emphasize, reinforce, or augment particular elements of it to ensure uncertainties are reduced to the maximum extent possible at this time. The overall strategy and the inclusion of the important plan elements listed below are the basis for NMFS' conclusion that the Plan has a solid foundation upon which to achieve “goals for the conservation and survival of the species.” Elements of the strategy are discussed under the three H-factors (habitat, harvest and hatcheries), adaptive management, all-H integration, and general comments.

4.1.2.1 Habitat

NMFS agrees with the Plan that protecting functioning habitat is one of the top priorities and first steps for achieving a viable ESU. Human population growth in the region, projected to increase by 1.4 million in the next 15 years, will create development pressure in areas currently providing good habitat function. The Plan describes the importance of protecting existing physical habitat and habitat-forming processes in Puget Sound (Volume I, Chapter 6 and the individual watershed plans in Volume II). The proposed strategies and actions for habitat protection presented in the Plan, if implemented, would increase the likelihood that the Plan will lead to recovery of the ESU.

Land Use Protection Programs. One of the important opportunities to protect existing habitat and habitat-forming processes discussed in the Plan is through updating and adopting Federal, state, and local land use protection programs, as well as more effectively combining regulatory, voluntary, and incentive-based protection programs. NMFS believes that there is significant uncertainty regarding the ability of current programs to address the Factor A threats identified in Section 4.2.1.2 of this Supplement and to produce the results for fish necessary to achieve recovery of the ESU. NMFS supports the use by all governments of these Plan goals as well as habitat limiting factors analyses provided in the individual watershed chapters to update local, state, and Federal ordinances and programs. Similarly, NMFS believes the Federal government plays a necessary role in achieving ESU recovery by implementing its various related regulatory programs—ESA, Clean Water Act, Rivers and Harbors Act, and others that may apply—in concert with the Plan's goals. NMFS is committed to fulfill its responsibilities under the ESA

and to use its authority and influence to ensure other Federal agencies apply their programs in concert with the Plan's goals.

Nearshore and Marine. Actions recommended in the nearshore chapter (Volume II: Regional Nearshore and Marine Aspects of Salmon Recovery in Puget Sound) in combination with the regional nearshore strategy presented in Volume I, Chapter 6, if implemented, would likely result in a major improvement in survival of Puget Sound Chinook Salmon. NMFS agrees with the basic premises of the Plan that the certainty of achieving significant improvements could be increased by paying particular attention to the specific natal and pocket estuaries and sites with subbasin stressors identified in Appendix E of the nearshore chapter. NMFS also supports the emphasis on nearshore and shoreline habitat protection measures for all watersheds, including the four watershed areas that do not have independent spawning populations but are used by Chinook salmon from multiple river basins, i.e. San Juan Islands, Island County, East Kitsap, and South Sound.

Lower Elevation Mainstems, Floodplains, and Estuaries. NMFS strongly supports the strategies and actions identified in the Plan that protect, preserve options for, and restore habitat functions in lower river areas. Deltas, estuaries, side-channels, and floodplains are important as rearing and migratory habitat for Chinook salmon and, as such, are important for recovery. In many watersheds, the lower river areas are also among the most altered environments used by Chinook salmon in Puget Sound. We respect the local decision processes that were used to arrive at the set of actions in each watershed, and believe that the certainty of achieving ESU viability would be improved by continued collaborative problem-solving and establishment of clear measures to monitor effectiveness and adaptively manage during the implementation phase to more fully develop or add actions to provide functional habitat in the lower river areas.

Instream Flows. Insufficient flows for fish are a key factor limiting recovery in many watersheds. NMFS supports the Plan's proposal for instream flow protection and enhancement (Volume I, Chapter 6). The Plan sets out a three-part strategy to establish protective instream flows, advance instream flow science, and implement flow programs over the next ten years. NMFS expects that instream flows will be implemented where already established and deemed necessary for a particular watershed while additional elements of the instream flow strategy for the ESU are being developed and applied. NMFS believes that a necessary component in addition to the regional strategy on instream flow protection is that the Washington Department of Ecology establish site-specific instream flow protection programs and/or regulations to support salmon recovery.

Forest Lands. Ongoing forest operations on National Forests will be reviewed by NMFS under section 7(a)(2) of the ESA as each National Forest proposes actions that may affect ESA-listed salmon. Forest operations on state forest lands and certain private forest lands covered by an existing Habitat Conservation Plan (HCP) have already been programmatically reviewed and approved by NMFS with ongoing monitoring. In addition, the remainder of private forest lands are regulated by existing state Forest Practice Rules, which are now under review per the National Environmental Protection Act (NEPA) as NMFS prepares to make an ESA section 10(a)(2)(B) permit issuance decision in early 2006.

Agricultural Lands. NMFS recognizes that farmers have a range of abilities to control management of their farm lands in ways that conserve salmon habitat. As described in several watershed plans, substantial improvements in riparian and water management are necessary in many situations to provide functional habitats for salmon. NMFS expects that proposed restorative actions on such lands will be consistent with local biological assessments and mirror the priorities described in watershed recovery plans. Farm management plans should address salmon habitat management when considering whether or how to treat erosion sites along streams and rivers; ensuring that all watercourses accessible to fish are maintained in a way that avoids exposure of salmon to maintenance actions; properly screening all water diversions; and using biocides and fertilizers consistent with the most recent safeguards identified by NMFS.

4.1.2.2 Harvest

NMFS agrees with the approach to harvest described in Volume I of the Plan, which relies upon the harvest Resource Management Plan (RMP) developed by the co-managers and approved by NMFS in 2005. Most of the individual watershed plans included in Volume II also incorporate the RMP by reference. Management of fisheries as described is intended to contribute to integrated, comprehensive protection and restoration of at-risk Chinook salmon populations and provide surplus fish for harvest, while minimizing the likelihood for harm to natural-origin fish populations. The RMP provides details regarding harvest actions to help recover Chinook salmon populations, including recent program modifications and measures applied to reduce the risk of harm to wild Chinook salmon while providing treaty tribal and non-tribal harvest opportunity on stronger salmon stocks (hatchery Chinook and non-listed salmon species). Some watershed chapters in Volume II also identify possible future harvest actions, more detail regarding specific fishery actions, and new programs that may benefit listed fish.

The current RMP will expire in April 2010. However, NMFS expects that the co-managers will continue to implement the harvest actions and objectives in the RMP unless revised through adoption of a new harvest plan after 2010 or through an adaptive management framework developed through recovery planning. NMFS will work with the Puget Sound Treaty Tribes and the Washington Department of Fish and Wildlife within the ESA, NEPA, U.S. v. Washington, and Shared Strategy forums and the public to evaluate the specific plans proposed within each watershed prior to formal decisions.

NMFS believes the following clarifications will increase the certainty that the actions implemented through the watershed plans will be effective in recovering the Puget Sound ESU.

- Volume I of the recovery plan describes the various harvest forums and the structure of the harvest management planning process. However, the evaluation and implementation strategies in watershed plans in Volume II do not make it clear that harvest management is a government-to-government process among tribal, state, and Federal managers. Fisheries affecting Puget Sound Chinook salmon are implemented under the principles of the Pacific Salmon Treaty, the Magnuson-Stevens Act and U.S. v. Washington. Fishery management will continue to fall under the purview of the laws governing each of the harvest management forums. Technical or policy forums created for the Plan and considering harvest issues must work with the parties in these existing harvest management forums to ensure that harvest planning activities are coordinated.

- The Plan identifies a need to reduce impacts of Canadian fisheries on some Puget Sound Chinook salmon populations. NMFS will be taking these needs into consideration in future PST negotiations. The Plan anticipates that restricting southern U.S. exploitation rates to not exceed the Critical Exploitation Rate Ceilings (CERC) described in the 2004-2009 Puget Sound Chinook Harvest RMP will not impede recovery. If further improvements in survival become necessary, NMFS will first seek to obtain such improvements through negotiated adjustments under the PST. If monitoring and evaluation indicate that further survival improvements are necessary, NMFS will review all Hs for potential improvements to achieve recovery of the Puget Sound Chinook ESU.
- Six of the Chinook management units used in Puget Sound harvest management contain multiple populations (Nooksack early, Skagit summer/fall, Skagit spring, Snohomish, Stillaguamish, and Lake Washington). Most are managed for survival and rebuilding of the weakest component population, and NMFS has concluded that the current RMP will not appreciably reduce the survival and recovery of the Puget Sound Chinook ESU. However, NMFS will continue to assess recovery and survival of the ESU based on the progress of individual populations across the ESU relative to their role in recovery and recognizing that not all populations must be at low risk of extinction to achieve viability for the ESU. Further assessment through the implementation of the recovery plan may indicate that there are populations within individual management units that are not currently the primary focus of harvest management that require additional protection for the recovery of the ESU. This may require revisions to the current harvest objectives to afford that protection. NMFS encourages the design and implementation of population-based monitoring and adaptive management programs that will allow such revisions in objectives if necessary.
- The co-manager use of Rebuilding Exploitation Rates (RERs) ranges from rates with strong quantitative analysis linked to survival and recovery to recent-year average rates in a subset of fisheries that are linked to increased escapement. NMFS will continue to work with the co-managers on further defining and assessing RERs in terms of quantifiable effects on survival and recovery (Volume I, Chapter 6) and using them as a tool to assess harvest impacts on survival and recovery. As the co-managers expand development and use of RERs based on a more quantitative definition and as more information becomes available, it should increase the certainty that harvest will not impede rebuilding of the ESU.

4.1.2.3 Hatcheries

NMFS agrees with the approach to artificial propagation described in Volume I, Chapter 6 of the Plan. Operation of the hatchery programs as described should appropriately support integrated, comprehensive protection and restoration of at-risk Chinook salmon populations and provide surplus fish for harvest, while minimizing the likelihood of harm to natural-origin fish populations. The individual watershed plans included in Volume II incorporate the majority of Puget Sound hatchery operation proposals described in HGMPs and RMPs assembled by the co-managers and currently under review by NMFS for evaluation and determination under the ESA. The HGMPs and RMPs provide specific details regarding hatchery actions implemented to help recover Chinook salmon populations, including recent program modifications and measures

applied to reduce the risk of harm to wild Chinook salmon while meeting hatchery fish production objectives. Volume II also identifies recent program changes, proposals for additional hatchery program modifications, and new programs that may benefit listed fish.

As indicated, NMFS is presently reviewing HGMPs and RMPs assembled for the Puget Sound region for ESA compliance. NMFS will work with the Puget Sound Treaty Tribes and the Washington Department of Fish and Wildlife within the ESA, NEPA, U.S. v Washington, and Shared Strategy forums to evaluate the specific plans proposed within each watershed prior to formal decisions.

NMFS believes the following clarifications will increase the certainty that the actions implemented through the watershed plans will be effective in recovering the Puget Sound ESU.

- The “Regional Hatchery Management Strategies” sub-section in Volume I, Chapter 6 of the Plan does not discuss and reference the non-Chinook Hatchery Resource Management Plan (PSTT and WDFW 2004), and the 74 HGMPs for co-manager coho, fall chum, pink, and sockeye salmon, and steelhead programs included under the RMP. These programs comprise the majority of hatchery actions in the Puget Sound region. How these non-Chinook salmon hatchery plans proposed for implementation in the region will affect threatened salmon, and prospects for their recovery, must be considered during Plan implementation. NMFS believes that monitoring and evaluation of ecological effects and effects on Chinook salmon VSP parameters associated with the hatchery production of these other salmon species is critical for gauging progress toward individual population and ESU recovery. To describe and address effects on Chinook recovery of non-Chinook hatchery strategies and actions, NMFS expects the Plan will be implemented to defer to and rely upon the non-Chinook Hatchery Resource Management Plan and the individual non-Chinook HGMPs proposed by the co-managers for implementation through the ESA review process.
- There is a programmatic need to consider as part of ongoing adaptive management the cumulative effects of all hatchery production included in the Plan on the survival and productivity of Chinook salmon in Puget Sound nearshore and marine areas, and its cumulative effects on (and limits posed by) the carrying capacity of the Puget Sound estuary.
- The Plan includes a good general description of the need for, and intent to, change or adjust hatchery programs as habitat improves. NMFS strongly supports PSTRT findings restated in the Plan regarding integration criteria and the need for more specificity for hatchery programs in each watershed to function in an integrated manner.

4.1.2.4 Adaptive Management and Monitoring

Volume I, Chapter 7 deals with adaptive management, monitoring, and implementation over the next ten years and for the future. The Plan provides specific actions needed to address all threats and identifies the parties with the authority, jurisdiction, or resources needed to implement each action. In some instances, the Plan deferred some management issues to the adaptive management process for resolution (Volume I, Chapters 5 and 7). The Plan acknowledges the

importance of these elements and the commitment to complete them. NMFS supports this commitment and, because of their importance and the time it will take to put programs that meet NMFS' adaptive management and monitoring standards in place, the goal to complete them by December 2006. Rigorous monitoring and adaptive management frameworks are essential to have in place early in Plan implementation, in order to ensure that the appropriate types and amounts of data are collected to assess the effectiveness of recovery actions and the progress towards recovery. NMFS will work with local watershed planning groups and the regional adaptive management steering committee to support development and implementation of the adaptive management and monitoring program.

NMFS is developing an adaptive management framework that will guide monitoring and evaluation programs for this and other recovery plans. The framework is based on a decision structure that identifies the questions that need to be asked to structure the monitoring and evaluation program. The decision structure builds upon (a) the ESU and population viability principles described in McElhany et al. (2000) and associated indicators proposed by the TRTs, and (b) the identified threats limiting population and ESU viability as defined by the five statutory listing factors in section 4(a)(1) of the ESA (see Supplement Section 4.2.1.2). NMFS' Salmon Recovery Division will provide a web-accessible link to this document and staff support to help Shared Strategy and other regional, state, tribal, and local entities develop appropriate research, monitoring, and evaluation plans for adaptive management.

4.1.2.5 All-H Integration

NMFS has reviewed the Plan with regard to integration of the H-factors and strongly supports the development of an integrated salmon recovery strategy in accordance with guidance provided by the PSTRT on addressing and considering cross-H issues in a watershed and region, using modeling and other tools as described in the Plan (Volume 1, Chapter 6). The PSTRT noted that the watersheds in Puget Sound are at varying stages in developing an integrated approach, and all have more to do during implementation or through adaptive management to make progress on H-integration. In a few cases, the co-managers operating harvest and hatchery programs were not involved in the assembly of watershed plans or submitted separate plans. NMFS expects harvest, hatchery, hydro, and habitat managers to work at integrating the Hs and will assist this process through government-to-government meetings with tribes as necessary.

4.1.2.6 General Comments

NMFS has the following general comments about the Plan and its implementation over time:

- The performance indicators in the watershed plans in Volume II of the Plan should be reviewed and revised as necessary to ensure they are accurate and relevant indicators of the performance of the management objectives, actions, and strategies.
- Technical models are important implementation tools for effective harvest, hatchery, and habitat management. Monitoring plans within the Puget Sound Chinook recovery plan should include evaluation of technical management models in order to increase the certainty that annual management regimes will meet their resource management and

conservation objectives. Where more direct measures of mortality for individual populations or management units are available, e.g., coded-wire tags, they should be used to assess impacts on listed species. The available tools and methods should be evaluated to determine which is the most accurate to use for each population or management unit to estimate impacts on listed species. Where currently unavailable, modeling tools should be developed to improve assessment of effects of management actions on salmon and salmon habitat.

- Implementation of the Plan is designed to ultimately achieve goals for the four VSP criteria of abundance, productivity, diversity, and spatial structure. While the diversity and spatial structure parameters have been generally described, the PSTRT has not more explicitly defined them. NMFS expects that management objectives for diversity and spatial structure will be developed over the next several years as part of recovery plan implementation. As these objectives are developed, the Recovery Plan and subsequent resource management plans will incorporate both the objectives and analyses of the effectiveness of the plans in meeting these objectives as well as those of abundance and productivity.
- Monitoring and evaluation may indicate further improvements in survival are necessary for recovery, beyond those provided by the actions in the recovery plan. In that case, NMFS will review all sectors for potential improvements to achieve recovery of the Puget Sound Chinook ESU. The viability ranges developed by the PSTRT, including the co-manager recovery targets, will be used in the assessment of ESU recovery. Such an assessment will evaluate contributions from all Hs to provide necessary survival improvements. NMFS will use its authorities as appropriate throughout plan implementation to achieve recovery of the Puget Sound Chinook ESU.

4.2 ESA section 4(f)(1)(B) Requirements

Section 4(f)(1)(B) of the ESA requires a recovery plan to include the following three elements:

1. “Objective, measurable criteria which, when met, would result in a determination, in accordance with the provisions of this section, that the species be removed from the list; and;
2. A description of site-specific management actions necessary to achieve the Plan’s goal for the conservation and survival of the species;
3. Estimates of the time required and cost to carry out those measures needed to achieve the Plan’s goal and to achieve intermediate steps toward that goal.”

This section contains a discussion and summary of how the Plan meets the three section 4(f)(1)(B) requirements.

4.2.1 Objective, Measurable Criteria

Evaluating a species for potential delisting requires an explicit analysis of population or demographic parameters (the biological recovery criteria) and also of threats under the five ESA listing factors in ESA section 4(a)(1). Together these make up the “objective, measurable criteria” required under section 4(f)(1)(B).

4.2.1.1 Biological Recovery Criteria

As described in Section 3.3 of this Supplement, the Plan adopts the viability criteria at both the population and ESU levels recommended by the PSTRT, as well as the state and tribal fisheries co-managers’ planning targets, which fall within the planning ranges for viability described by the PSTRT. NMFS will propose to delist the listed Puget Sound Chinook salmon ESU addressed by this Plan when the viability criteria are achieved for the entire ESU.

These criteria represent the best scientific analysis with most current understanding of the populations and ESU at this time. As the recovery plan is implemented, additional information will become available along with new scientific analyses that can increase certainty about whether the threats have been abated, whether improvements in population and ESU status have occurred for Chinook salmon, and whether linkages between threats and changes in salmon status are understood. These recovery criteria and the factors for delisting will be assessed through the adaptive management program under development for the Plan, and there will be a thorough review of the criteria at the five and ten-year status review of the ESU.

The PSTRT’s ESU-level viability criteria for Puget Sound Chinook are described in the paragraphs below and in *Planning Ranges and Preliminary Guidelines for the Delisting and Recovery of the Puget Sound Chinook Salmon Evolutionarily Significant Unit* (Ruckelshaus et al., 2002).

ESU Level Criteria. In two of the three biogeographical regions (the Strait of Juan de Fuca region and the Strait of Georgia region), the PSTRT review concluded that there is relatively low certainty of meeting ESU criteria because all remaining populations need to achieve low risk, and they all currently are at very low numbers. NMFS accepts the PSTRT conclusion that although inherent uncertainty in these regions is high, watershed groups in these two regions identified scientifically sound strategies and actions to redress the high risk status of their populations. If all the strategies identified in the Plan are implemented, including adaptive management measures, NMFS believes the uncertainties described for these two regions would likely be reduced.

In the Hood Canal biogeographical region, it is so far not possible to determine how likely it is that the Skokomish population will achieve a low risk status, since there is not yet a detailed set of recommendations for the Skokomish watershed. When a plan is available NMFS will evaluate it and will be able to make a more definitive determination about the likelihood of that population meeting the viability criteria (see discussion in Section 4.2.2).

The PSTRT review concluded that the remaining two geographic regions (the Whidbey Basin region, containing ten remaining populations, and the Central/South Sound region, containing six remaining populations) have relatively higher certainty of achieving ESU viability criteria

because there are more extant populations at relatively lower risk status in these two regions. As stated in the Plan (Volume I, Chapter 5), there are gaps in local watershed plans in these regions that, if filled, would increase the likelihood of achieving at least two low risk populations in each of these regions. The Plan states the expectation of being able to have more certainty after the first ten years of implementation in identifying which of these populations have the best chance of achieving low risk status.

The PSTRT noted that the Nisqually watershed is in comparatively good condition and thus the certainty that the population could be recovered is among the greatest in the Central/South biogeographical region. NMFS concludes that protecting the existing habitat and working toward a viable population in the Nisqually watershed would help to buffer the entire biogeographical region against further risk. NMFS concludes that the Nisqually population is among those that would need to achieve low risk under any recovery scenario ultimately selected for Puget Sound Chinook salmon.

The Plan also proposes additional measures to address the uncertainties identified for the other regions in the May 2005 technical and policy review (Volume I, Chapter 5). NMFS believes these measures plus the additions identified by NMFS in Section 4.1.2 of this supplement, if implemented, including the adaptive management actions, would resolve many of the remaining uncertainties that are possible at this stage to address.

Population Level Planning Ranges and Targets. Figure 4.1 of the Plan (see Section 3.3.2 of this Supplement) shows recent-year spawner abundances for Puget Sound Chinook salmon populations against PSTRT planning ranges for viability and the state and tribal fisheries co-managers' planning targets. The numbers provide a snapshot of the current population abundances contrasted against abundances at which the PSTRT and co-managers believe the populations would be viable. Most watershed areas adopted the co-managers' planning targets as their long-term measurable recovery goals and some include measurable habitat goals (Volume II, watershed plans). NMFS supports the co-manager planning targets and recognizes that in nearly all cases, the targets fall within the viability ranges identified by the PSTRT.

4.2.1.2 Listing Factor (Threats) Criteria

In order to delist the ESU, the criteria above must be met and the listing factors must be addressed to the satisfaction of NMFS. Listing factors are those features that were evaluated under section 4(a)(1) when the initial determination was made to list the species for protection under the ESA. These may or may not still be limiting recovery when in the future NMFS reevaluates the status of the species to determine whether the protections of the ESA are no longer warranted and the species could be "delisted."

At the time of a delisting decision, NMFS will examine whether the section 4(a)(1) listing factors have been addressed. To assist in this examination, NMFS will use the listing factors (or threats) criteria described below in addition to evaluation of biological recovery criteria.

The five listing factors (or threats) described in section 4(a)(1) of the ESA are the following:

- A. The present or threatened destruction, modification, or curtailment of its habitat or range
- B. Over-utilization for commercial, recreational, scientific or educational purposes
- C. Disease or predation
- D. The inadequacy of existing regulatory mechanisms
- E. Other natural or manmade factors affecting its continued existence

NMFS proposes that, to determine that the affected ESU is recovered to the point that it no longer requires the protections of the ESA, the above listing factors should be addressed according to specific criteria identified for each of them so that delisting is not likely to result in re-emergence of the threat. It is also possible that current perceived threats will become insignificant in the future because of changes in the natural environment or changes in the way threats affect the entire life cycle of salmon. Consequently, NMFS expects that the ranking of threats will change over time and that new threats may be identified. During the status reviews, NMFS will evaluate and review the listing factor criteria under conditions at the time.

NMFS is providing the specific criteria listed below for each of the relevant listing/delisting factors to help to ensure that underlying causes of decline have been addressed and mitigated prior to considering a species for delisting. While the Plan does not include explicit listing factor (threats) criteria, it does describe threats and limiting factors (Volume I, Chapter 3) in a manner that clearly corresponds to the section 4(a)(1) listing factors. For example, the Plan describes the impacts on salmon that have resulted from habitat destruction by hydropower operation [4(a)(1)(A)] and harvest management [4(a)(1)(B)]. Accordingly, NMFS expects that if the Plan's proposed actions to address the threats and limiting factors are implemented, they will make substantial progress toward meeting the listing factor (threats) criteria specified here.

Factor A: The present or threatened destruction, modification, or curtailment of a species' habitat or range. Each of the threats criteria described below is related to one or more of the major factors limiting recovery described in the Plan and listed in NMFS' 2005 Report to Congress on the Pacific Coastal Salmon Recovery Fund (PCSRF), i.e., (1) degraded floodplain and in-river channel structure; (2) degraded estuarine conditions and loss of estuarine habitat; (3) riparian area degradation and loss of in-river large woody debris; (4) excessive fine-grained sediment in spawning gravel; (5) degraded water quality and temperature; (6) degraded nearshore conditions; (7) impaired passage for migrating fish; and (8) severely altered flow regime.

To determine that the ESU is recovered, threats to habitat should be addressed as outlined below:

1. Passage obstructions (e.g., dams, tidegates, and culverts) are removed or modified to restore fish access to historically accessible habitat to support region-wide recovery goals described in the recovery scenario ultimately selected for Puget Sound Chinook salmon.
2. Channel function, including vegetated riparian areas, instream wood, stream-bank stability, off-channel and side-channel habitats, natural substrate and sediment processes, and channel

complexity is restored to provide rearing, migration, and spawning habitat to meet the Plan's recovery goals.

3. Instream flow conditions that support salmon rearing, spawning, and migration needs and meet the Chinook population targets are achieved.
4. Floodplain function and the availability of floodplain habitats for salmon is restored to a degree sufficient to support a viable ESU, including tidal swamp and marsh habitat in estuaries and the tidal freshwater portion of the lower rivers. This restoration should include connectedness between river and floodplain and the restoration of impaired sediment delivery processes and conditions affecting both estuaries and lower mainstem rivers.
5. Deleterious effects of stormwater runoff are eliminated or controlled so as not to impair water quality and quantity in salmonid streams or the riparian habitats supporting them.
6. Agricultural practices are implemented to protect and restore riparian areas, floodplains, and stream channels, and to protect water quality from sediment, pesticide, herbicide, and fertilizer runoff.
7. Urban and rural development, including land use conversion from agriculture and forest land to developed areas, does not impair water quality or result in dysfunctional stream conditions.
8. Nearshore processes are protected and restored so that ecological inputs (of sediment, insects, leaves and wood) to drift cells and mudflats function properly to support Chinook salmon and the species they prey upon.
9. The effects of toxic contaminants on salmonid fitness and survival in the Puget Sound estuaries, lower mainstem rivers, and nearshore ocean are sufficiently limited so as not to affect recovery.
10. Activities that dredge or fill in nearshore and river beds or harden stream banks are sufficiently mitigated.
11. Forest management practices that protect and restore watershed and stream functions are implemented on Federal, state, tribal, and private lands.
12. Technical tools accurately assess the impacts of habitat management actions.

Draft watershed recovery plans that do not fully address all of these elements are not as likely to be successful as plans that comprehensively protect and restore ecological processes that support Puget Sound Chinook salmon (Montgomery et al., 2003, Beechie et al., 2003, Roni 2005, Bisson et al., 1997, Spence et al., 1996, Simenstad et al., 1982, and Gregory and Bisson 1997).

For additional information on current threats resulting from habitat degradation and loss, see the Plan, Volume I, Chapter 3, the individual watershed chapters in Volume II, and the 2005 PCSRF Report to Congress.

Factor B. Overutilization for commercial, recreational, or educational purposes. To determine that the ESU is recovered, any utilization for commercial, recreational, scientific, or educational purposes should be addressed as outlined below:

1. Fishery management plans for salmon ESUs are in place that (a) accurately account for total fishery mortality (i.e., both landed catch and non-landed mortalities) and constrain mortality rates for individual populations to levels that are consistent with achieving ESU viability (i.e., provide for adequate spawning escapement given intrinsic productivity for populations representative of the life history and major regional divisions in the ESU); and (b) are implemented so that any effects on the abundance, productivity, diversity, and spatial structure of populations are consistent with the recovery of the ESU.
2. Technical tools accurately assess the potential impacts of fishery management actions.
3. Rules and regulations for fishery management actions are effectively enforced.

For additional information on threats related to harvest actions, see Volume I, Chapters 3 and 6, and the individual watershed chapters in Volume II.

Factor C. Disease or predation. To determine that the ESU is recovered, any disease or predation that threatens its continued existence should be addressed as outlined below:

1. Hatchery operations apply measures that reduce the risk that natural Chinook salmon populations are adversely affected by fish diseases and parasites.
2. Suitable methods and levels of marine mammal control are identified and implemented to mitigate negative interactions with salmon where predation poses significant risks to recovery.
3. Populations of introduced game fish are managed such that competition with or predation on Chinook salmon does not impede salmon population recovery.

For additional information on current threats resulting from disease or predation, see the Plan, Volume I, Chapter 3, and Volume II, individual watershed chapters.

Factor D. The inadequacy of existing regulatory mechanisms. To determine that the ESU is recovered, any inadequacy of existing regulatory mechanisms that threatens its continued existence should be addressed as outlined below:

1. Regulatory mechanisms are in place to ensure that any effects on the abundance, productivity, diversity, and spatial structure of populations are consistent with the recovery of the ESU.
2. Technical tools accurately assess the potential impacts of regulatory actions.
3. Rules and regulations for habitat protection and restoration are effectively enforced.
4. Habitat conditions, watershed functions and nearshore processes are protected and restored through land-use planning that guides human population growth and development.

5. Habitat conditions and watershed function are protected and restored through regulations that govern resource extraction such as timber harvest and gravel mining.
6. Habitat conditions, watershed functions and nearshore processes are protected and restored through land protection agreements as appropriate, where existing policy or regulations do not provide adequate protection.
7. Adequate resources, priorities, regulatory frameworks, and coordination mechanisms are established and/or maintained for effective enforcement of land and water use regulations that protect and restore habitats and marine and freshwater water bodies and for the effective management of fisheries.
8. Regulatory, control, and education measures to prevent additional exotic species invasions are in place.

For additional information on existing regulatory mechanisms, see the actions in Volume I, Chapter 6. and Volume II, individual watershed chapters.

Factor E. Other natural or man-made factors affecting continued existence. To determine that the ESU is recovered, other natural and man-made threats to its continued existence should be addressed as outlined below:

1. Hatchery management plans are in place to ensure that any effects on the abundance, productivity, diversity, and spatial structure of populations are consistent with the recovery of the ESU.
2. Technical tools accurately assess the potential impacts of hatchery management actions.
3. Rules and regulations for hatchery management and protection are effectively enforced.
4. Hatchery programs are operated in a manner that is consistent with individual watershed and region-wide recovery approaches; appropriate criteria are used for the integration of hatchery Chinook salmon populations and extant natural populations inhabiting watersheds where the hatchery fish return.
5. Hatcheries operate using appropriate ecological, genetic, and demographic risk containment measures for (1) hatchery-origin adults returning to natural spawning areas, (2) release of hatchery juveniles, (3) handling of natural-origin adults at hatchery facilities, (4) withdrawal of water for hatchery use, (5) discharge of hatchery effluent, and (6) maintenance of fish health during their propagation in the hatchery.
6. Hatcheries mark or tag Chinook salmon so that they can be differentiated from natural Chinook salmon in fisheries, migratory areas, and as adults returning to hatcheries and natural spawning areas.
7. Mechanisms are in place to reduce the incidence of, and impacts from, introduced, invasive, or exotic species.

8. Nutrient enrichment programs must be evaluated to determine where additional nutrient inputs can provide significant benefits.
9. Ecological functions of salmon, including their benefits in cycling ocean-derived nutrients into freshwater areas, are considered in fishery, hatchery, and habitat management.

4.2.1.3 Application of the Criteria to Delisting Decisions

NMFS concludes that the Plan meets the first of the 4(f) requirements for a recovery plan: it has objective, measurable criteria which, when met, would result in a determination, in accordance with the provisions of Section 4.2 of the Supplement, that the species be removed from the list.

In accordance with our responsibilities under section 4(c)(2) of the Act, NMFS will conduct status reviews of Puget Sound Chinook salmon at least once every five years to evaluate the ESU's status and determine whether the ESU should be removed from the list or changed in status. Such evaluations will take into account the following:

- The biological recovery criteria (Ruckelshaus et al., 2002) and listing factor (threats) criteria described above.
- Principles presented in the Viable Salmonid Populations paper (McElhany et al., 2000).
- Co-managers' recovery planning targets.
- Best available information on population and ESU status and new advances in risk evaluation methodologies.
- Considerations consistent with the VSP paper and the PSTRT's recommendations, including: the number of viable populations; the number and status of other extant populations; the status of core populations; the distribution of viable populations relative to the range of historical conditions supporting viable populations; linkages and connectivity among viable populations; the diversity of life history and phenotypes expressed; and considerations regarding catastrophic risk.
- Principles laid out in NMFS' Hatchery Listing Policy (70 FR 37204, June 28, 2005).

The biological (4.2.1.1) and listing factor (threats) criteria (4.2.1.2), when taken together, describe conditions, commitments, and administrative measures that, when met, would result in a determination that the species is not likely to become endangered within the foreseeable future throughout all or a significant portion of its range.

4.2.2 Site-Specific Management Actions

The ESA requires a recovery plan to include site-specific management actions. NMFS believes the Plan meets this requirement; the basis for this conclusion is included in this section.

Volume II of the Plan contains detailed strategies and actions for 13 of the 14 watersheds (except the Hood Canal Skokomish population, discussed further in Section 4.2.2.1) and the nearshore

areas in Puget Sound. The watershed profiles presented in Volume I, Chapter 5 summarize the key strategies and actions proposed in each of the local plans. The watershed plans propose actions to address limiting factors identified through their local watershed assessments. Each watershed group provided its own set of protection and restoration management strategies for specific subbasin, river reaches, estuaries, and nearshore areas tailored to the conditions of their watershed.

Some of the watershed plans include site-specific projects for recovery actions, while others describe changes needed by area and specify the results needed from a combination of actions. In all watersheds, the actions are based on the results of local watershed and regional technical assessments. In addition, each of the watershed profiles in Volume I includes a summary of key uncertainties and the enhancements identified by the PSTRT and the Shared Strategy interagency policy group during its May 2005 review of the watershed plans that are needed to reduce uncertainty and risk to the populations and ESU. Those additional measures were developed to provide greater specificity regarding the necessary management actions and priorities for implementation in each watershed. Where appropriate, the PSTRT and interagency policy group recommended sequencing actions to maximize the potential benefit to the populations. They also identified specific issues for inclusion in the adaptive management program at both local and regional scales to address uncertainties over time.

Following the PSTRT review, NMFS reviewed all the watershed chapters, including many of their supporting documents. NMFS agrees with the Plan's approach that as plan implementation and adaptive management proceeds, proposed actions in each watershed will be further refined and prioritized for implementation in a manner that specifically addresses the primary factors limiting recovery. NMFS strongly supports the importance of testing hypotheses about limiting factors through adaptive management and monitoring.

NMFS agrees with the Plan that some strategies and actions need to be implemented at the ESU scale to address the factors limiting recovery. These are described in Volume I, Chapter 6 of the Plan. As plan implementation and adaptive management unfolds, NMFS will continue to work with the Shared Strategy participants and each watershed to ensure that priorities for implementing recovery actions at the regional or ESU level continue to be set in a manner that is consistent with the major limiting factors for the ESU.

NMFS acknowledges the sources of uncertainty identified by the PSTRT and generally supports the recommendations to reduce them (see Results section of watershed profiles, Volume I, Chapter 5). NMFS concludes that implementing the hatchery, harvest, and habitat watershed and regional plan elements, inclusive of the PSTRT recommendations in Chapter 5, with careful monitoring of results so that adjustments in strategies and actions can be made, is acceptable to increase certainty over time that populations will persist over the long-term.

As the Plan notes, NMFS recognizes that additional site-specific actions will need to be or are currently being developed in the Skokomish, Skagit, Lake Washington (Cedar/Sammamish), Green, and Puyallup/White watersheds, and supports those proposals that are included in the Plan for doing so.

4.2.2.1 Skokomish

In the Hood Canal biogeographical region, the PSTRT identified two Chinook salmon populations—the Mid-Hood Canal and Skokomish. In order to meet the ESU viability criteria established by the PSTRT, both of these populations need to achieve a low risk status over time. It is not as yet possible to determine how the Skokomish Chinook population will achieve low risk status. NMFS recognizes that the ongoing litigation over Cushman Dam in the Skokomish River basin currently limits the ability of recovery planners to develop a watershed plan containing specific recovery strategies and actions for the Skokomish population. Because no local plan was available for review by the PSTRT and Shared Strategy interagency policy group in May 2005, NMFS believes that a precautionary approach is needed in watershed planning for the interim period to preserve future options for recovering the Skokomish population. NMFS understands that state and tribal co-managers are currently in the process of writing a local plan for the Skokomish River basin. They intend to complete that plan in early 2006. NMFS will review that plan when it becomes available and work with the co-managers and local jurisdictions to ensure that habitat, harvest, and hatchery actions applied to recover the Skokomish population are integrated. In the interim, NMFS and the PSTRT have reviewed the Mid-Hood Canal watershed plan and proposed measures to ensure that future recovery options for both Chinook salmon populations in the Hood Canal biogeographical region are preserved (Volume I, Chapter 5 of the Plan).

4.2.2.2 Skagit

The Plan states that the 2005 Skagit Chinook Recovery Plan was developed by the Swinomish Indian Tribal Community, the Sauk-Suiattle Indian Tribe, and the Washington Department of Fish and Wildlife (Volume I, Chapter 5). The Plan further states that the tribes and state hope to engage local groups and individuals to improve the Plan and gain commitments to implementation. NMFS believes the 2005 Skagit Chinook Recovery Plan includes a solid technical foundation for conserving Chinook salmon and supports the ongoing effort among tribal, state, county, and local groups in the Skagit to reach agreements on the watershed plan through a collaborative process at the local level. NMFS will continue to work with all the parties as that collaboration proceeds. If the tribal, state, and local interests can reach agreement on science-based, locally supported plan modifications before this Supplement is finalized in the Federal Register, NMFS will strive to include agreed-to modifications in the final Federal Register notice in early 2006. For areas where no agreement is reached, NOAA Fisheries Service will need to make a determination among competing interests regarding the most appropriate path to take regarding adoption of a final plan.

4.2.2.3 Lake Washington (Cedar/Sammamish)

NMFS understands that the Watershed Resource Inventory Area 8 (WRIA) group responsible for submitting the habitat protection and restoration plan for the Lake Washington watershed intends to collaborate with the co-managers to integrate proposed habitat-related recovery actions with co-manager harvest and hatchery plans for salmon populations in the watershed. NMFS expects that the WRIA 8 group and the co-managers will follow suggestions for integrating habitat, harvest, and hatchery actions that are included in the Plan's Chapter 5 "Profile Results" sections

and in the PSTRT's technical guidelines (Ruckelshaus et al., 2003). NMFS will assist this collaborative process through government-to-government meetings with the Muckleshoot and Suquamish tribes to ensure that the resultant integrated plan for the Lake Washington watershed adequately addresses issues relating to treaty-reserved fishing rights.

4.2.2.4 Green

As noted in the Volume II plan for the Green watershed, there is a need to integrate hatchery and harvest plans developed by the co-managers with the habitat protection and restoration plan for the watershed submitted by the WRIA 9 group. NMFS expects that the WRIA 9 group and the co-managers will follow suggestions for integrating habitat, harvest, and hatchery actions that are included in the Plan's Chapter 5 "Profile Results" sections and in the PSTRT's technical guidelines (Ruckelshaus et al., 2003). NMFS will assist this collaborative process through government-to-government meetings with the Muckleshoot and Suquamish tribes to ensure that the resultant integrated plan for the Green watershed adequately addresses issues relating to treaty-reserved fishing rights.

4.2.2.5 Puyallup/White

NMFS understands that since the review of the habitat protection and restoration plan submitted by Pierce County and the separate state and tribal co-managers' salmon recovery plan, the co-managers and Pierce County have initiated steps that will enable them to advance integration of the habitat, harvest, and hatchery factors, adaptive management, and other plan elements. NMFS supports and encourages this collaboration to combine the two plans. NMFS expects that Pierce County and the co-managers will follow suggestions for integrating habitat, harvest, and hatchery actions that are included in the Plan's Chapter 5 "Profile Results" sections and in the PSTRT's technical guidelines (Ruckelshaus et al., 2003). NMFS will assist this collaborative process through continued government-to-government meetings with the Puyallup and Muckleshoot Tribes to ensure that the resultant plan for the Puyallup/White watershed adequately addresses issues relating to treaty-reserved fishing rights.

NMFS concludes that the Plan meets the second of the 4(f) requirements for a recovery plan: it has a description of site-specific management actions, inclusive of the above qualifications and additional actions that NMFS believes are necessary to achieve the Plan's goal for the conservation and survival of the species.

4.2.3 Time and Cost Estimates

Section 3.8 summarizes the estimates of time and cost required to carry out the measures needed to achieve the Plan's goal and to achieve intermediate steps toward that goal. The Plan estimates that recovery could take from 50 to 100 years. Recovery objectives and strategies are aimed at the long-term recovery goal. Volume I, Chapter 8 and the individual watershed plans in Volume II provide cost estimates to carry out specific recovery actions for the first ten years of plan implementation. The Plan indicates that financing this first phase is expected to result in improved conditions for all Puget Sound Chinook populations per the PSTRT viability criteria, and is expected to put the ESU on a recovery trajectory. The Plan also provides cost estimates for

programs that span multiple watersheds: hatchery improvements, nearshore and marine habitat protection and restoration, and incentive programs for habitat restoration and conservation on farm and small forest lands. (See Chapter 8, Figure 8.1 for ten-year cost estimates.)

NMFS supports the policy determination to focus on the first ten years of implementation, with the proviso that specific actions and costs will be estimated before the end of this first implementation period for subsequent years to achieve long-term goals, and to proceed until a determination is made that listing is no longer necessary. NMFS agrees that ten years is a reasonable period of time during which to implement and evaluate the actions identified in the Plan to gain a preliminary view of the status and trends of important recovery indicators and make mid-course corrections as needed. NMFS further understands that each watershed area will, if it has not already done so, prioritize its ten-year actions and establish work plans in shorter time-increments to match the availability of funding sources. NMFS strongly supports the Plan's intention to conduct additional economic analyses into the adaptive management process over time and to use these in realigning priorities as appropriate.

NMFS recognizes that the breadth and completeness of the time and cost estimate components of the local watershed plans is quite varied. NMFS anticipates that as implementation of the Plan proceeds and as watershed groups finalize their priorities for project implementation and sequencing, they will develop more explicit estimates of time and cost.

The Plan acknowledges that available funding may not fully cover each watershed's full ten-year plan. The PSTRT's conclusions about the certainty of achieving plan outcomes assume implementation of the entire ten-year suite of priority actions. NMFS encourages regional leaders to address this issue as results and progress become apparent in the next ten years—they may need to re-evaluate the funding strategy to determine whether the fundraising goal will need to be adjusted.

NMFS concludes that the Plan meets the third of the 4(f) requirements for a recovery plan: it includes estimates of the time required and cost to carry out the measures needed to achieve the Plan's goal and to achieve intermediate steps toward that goal.

4.2.4 *ESA section 4(f) Conclusion*

NMFS reviewed the Plan (Volume I and the individual watershed chapters in Volume II) as well as the notes and conclusions of the PSTRT from its review of the watershed plans in May 2005. Based on that combined evaluation, NMFS believes that the Plan (Volumes I and II, including relevant monitoring and adaptive management elements) meets the Recovery Plan requirements in section 4(f) of the Endangered Species Act.

5.0 NMFS' INTENDED USE OF THE PLAN

As a result of the evaluation of the Plan presented in Sections 3.0 and 4.0, and after considering public comment on the Plan and finalizing the supplement, NMFS intends to adopt it as the ESA recovery plan for the Puget Sound Chinook salmon ESU.

As noted above, NMFS prefers to rely on locally developed recovery plans to the extent possible. By endorsing a locally developed recovery plan, NMFS is making a commitment to implement the actions in the Plan for which we have authority, to work cooperatively on implementation of other actions, and to encourage other Federal agencies to implement plan actions for which they have responsibility and authority. We will also encourage the State of Washington to seek similar implementation commitments from state agencies and local governments.

5.1 ESA-Related Decision-Making

Recovery plans provide context and a technical foundation for NMFS decisions. NMFS will use completed plans to:

- Ensure an integrated approach to ESA section 7 consultations across all “Hs.”
- Judge the significance of proposed actions relative to the importance of the affected habitat and population for ESU survival and recovery.
- Guide and expedite ESA section 7 consultations, HCP review and approvals, section 4(d) rules, and permitting applications for proposed actions consistent with recovery plans.
- Evaluate the degree to which a proposed action is consistent with an applicable recovery plan in making ESA determinations.
 - Proposed actions that are consistent with an applicable recovery plan are more likely to be approved.
 - Proposed actions that are inconsistent with an applicable recovery plan will have an additional burden to demonstrate that they are nonetheless consistent with a no-jeopardy determination.

Future regulatory reviews under sections 7 and 10 of the ESA can be affected by this recovery plan. The Plan describes the most significant limiting factors and threats facing the ESU as well as the greatest opportunities for improving survival across the Hs. This information will provide important context for evaluating the effects of actions subject to sections 7 and 10 in Puget Sound. Recovery plan information that should aid these evaluations include: descriptions of independent populations; viability criteria for abundance, productivity, diversity and distribution; limiting factors and threats; and geographic and temporal context for considering risks and for prioritizing recovery actions.

Future section 7 consultations can also be affected by recovery plans because Federal programs will need to incorporate the technical assessments completed by non-Federal entities. For example, biological assessments for section 7 consultations in any given watershed would benefit from incorporating technical information from Volumes I and II of the Plan.

Section 7 consultations could also be affected by recovery plans as a result of more effective use of section 7 conservation recommendations. The Federal agencies should anticipate that significant improvements in survival are needed to recover listed ESUs. Section 7(a)(1) states

that the Federal agencies shall, in consultation with NMFS, utilize their authorities in furtherance of the purposes of the ESA by carrying out programs for the conservation of listed species. Section 7 conservation recommendations may provide an appropriate vehicle for NMFS to encourage Federal conservation programs in the affected area.

5.2 Priority Setting

- Recovery plans help focus funding and other efforts on priority areas and actions that must be performed first to achieve recovery. NMFS has recommended to states and tribes that PCSRF funding requests should be consistent with recovery plans.
- NMFS will prioritize permitting for actions implementing recovery plans and for actions that are consistent with recovery plans.
- Recovery plans will improve cost effectiveness by identifying priorities and by setting up credible adaptive management frameworks.

5.3 Best Available Science

In some instances, NMFS believes that science other than that provided in Volumes 1 and II of this recovery plan may be more applicable in addressing specific recovery issues. Therefore, NMFS believes that this recovery plan is based on the best available science except for those specific issues where NMFS determines, through a critical assessment of all available scientific information, that alternative scientific conclusions are warranted. NMFS is committed to work with local watershed planning groups to share and gain information and perspectives so that plan implementation efforts across Puget Sound can improve over time.

5.4 Changes Incorporated Over Time

NMFS expects that in response to public comments received on the Plan and through the adaptive management process, additional Plan actions, or clarifications of existing actions, may be incorporated over time.

5.5 Further Public Process

NMFS partnered with Shared Strategy in the recovery planning process and associated public and watershed events described above to encourage local participation in development of the Plan. Publication of this Supplement for public review and comment initiates NMFS' formal administrative process. In accordance with NMFS' Endangered and Threatened Species Recovery Planning Guidelines (55 FR 24296, NMFS 1990), NMFS is publishing a Notice of Availability (NOA) of the Shared Strategy's Draft Puget Sound Salmon Recovery Plan. Concurrent with NMFS' publication of that notice, the agency is publishing this Supplement to the Draft Puget Sound Salmon Recovery Plan.

NMFS is publishing the NOA and Supplement for 60 days, as specified in NMFS' Interim Endangered and Threatened Species Recovery Planning Guidance (NMFS **October** 2004). Public workshops to discuss the Plan and solicit public input about it will be held throughout the Puget

Sound region during this 60-day public comment period. NMFS will summarize the comments received and provide responses in a subsequent Federal Register notice in early 2006.

The recovery planning guidelines state that information obtained through public comments should be addressed and incorporated throughout the final recovery plan as appropriate. Upon completion of the public review process and incorporation of the necessary updates to the Plan, NMFS intends to approve a final recovery plan for Puget Sound Chinook salmon. NMFS will publish a NOA of the final plan or plan Supplement at that time.

Places and times of public meetings will be posted on NMFS and Shared Strategy websites. All Plan materials can be found at the NMFS website at <http://www.nwr.noaa.gov/Salmon-Recovery-Planning.cfm> and the Shared Strategy website at www.sharedsalmonstrategy.org. Printed versions of Volume I and compact discs for Volume II will be available at public locations also listed on the Shared Strategy website.

6.0 ABBREVIATIONS

AMM	adaptive management and monitoring
CERC	critical exploitation rate ceilings
ESA	Endangered Species Act
ESU	evolutionarily significant unit
GMA	Growth Management Act (Washington)
HCP	Habitat Conservation Plan
HGMP	Hatchery and Genetic Management Plan
Hs	Habitat, harvest, hatcheries, hydropower
NEPA	National Environmental Protection Act
NMFS	National Marine Fisheries Service
NOA	Notice of Availability
PCSRF	Pacific Coastal Salmon Recovery Fund
PSTT	Puget Sound Treaty Tribes
PST	Pacific Salmon Treaty
PSTRT	Puget Sound Technical Recovery Team
RERs	rebuilding exploitation rates
RMP	Resource Management Plan
SMA	Shoreline Management Act (Washington)
TRT	Technical Recovery Team
USFWS	U.S. Fish and Wildlife Service
VSP	viable salmonid population
WDFW	Washington Department of Fish and Wildlife
WRIA	Watershed Resource Inventory Area (Washington)

7.0 REFERENCES

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